We claim:

1. An electrochemiluminescence cell comprising an electrode capable of inducing an electrochemiluminescence-active species to electrochemiluminesce, said electrode comprising a platinum alloy comprising:

a first predetermined weight percent of platinum; and

a second predetermined weight percent of an element other than platinum;

wherein said first predetermined weight percent and said second predetermined weight percent are greater than zero.

2. The cell of claim 1, wherein said element is from the group comprising Ni, Pd, Co, Fe, Ru, Os, Cr, Mo, Zn, Nb, Ir, Rh and W.

3. The cell of claim 1, wherein said element is a transition element.

4. The cell of claim 2, wherein said second weight percent in the range 1% to 80%.

5. The cell of claim 4, wherein at a pH in the range 6.5 to 8.0 at said electrode, tripropylamine is oxidized at a lower potential than water.

6. The cell of claim 5, wherein at 1.3 V (vs. Ag/AgCl) the current density at said electrode for the oxidation of tripropylamine is at least twice as large as the current density at said electrode for the oxidation of water.

7. The cell of claim 6 wherein said electrode is a counter electrode.

8. The cell of claim 6, wherein said electrode is a working electrode for generating electrochemiluminescence.

9. The cell of claim 8, further comprising

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a counter electrode and

an optical detection window in optical registration with said working electrode.

10. The cell of claim 8, further comprising

a counter electrode; and

a support, attached to said counter electrode, having a transparent portion in optical registration with said working electrode.

11. The cell of claim 10, wherein said counter electrode comprises at least one field extending element interposed between said transparent portion and said working electrode.

12. The cell of claim 11 wherein said working electrode is capable of inducing a ruthenium-*tris*-bipyridine moiety to electrochemiluminesce in the presence of tripropylamine.

13. The cell of claim 12, further comprising a magnet adjacent said working electrode to collect magnetizable particles thereon.

14. The cell of claim 13, wherein said cell is a flow cell.

15. The cell of claim 14, further comprising a reference electrode.

16. The cell of claim 15, further comprising a light detector for detecting electrochemiluminescence generated in said cell.

17. The cell of claim 16, wherein said light detector is a photodiode.

18. The cell of claim 17, further comprising a source of electrical energy coupled to said electrodes.

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19. The electrochemiluminescence cell of claim 18, wherein said source of electrical energy is a potentiostat.

20. An electrochemiluminescence cell comprising an electrode capable of inducing an electrochemiluminescence-active species to electrochemiluminesce, said electrode comprising rhodium or a rhodium alloy comprising:

a first predetermined weight percent greater than zero of rhodium; and

optionally, a second predetermined weight percent greater than zero of an element other than rhodium.

21. The cell of claim 20, wherein said element is from the group comprising Pt, Ni, Pd, Co, Fe, Ru, Os, Cr, Mo, Zn, Nb, Ir, and W.

22. An electrochemiluminescence cell comprising

an electrode capable of inducing an electrochemiluminescence-active species to electrochemiluminesce, said electrode comprising an iridium alloy comprising:

a first predetermined weight percent of iridium; and

a second predetermined weight percent of an element other than iridium;

wherein said first predetermined weight percent and said second predetermined weight percent are greater than zero.

23. The cell of claim 22, wherein said element is from the group comprising Pt, Ni, Pd, Co, Fe, Ru, Os, Cr, Mo, Zn, Nb, Rh, and W.

24. An electrochemiluminescence cell comprising:

a working electrode capable of inducing an electrochemiluminescence-active species to electrochemiluminesce;

a counter electrode comprising a platinum alloy, iridium, rhodium, a rhodium alloy or an iridium alloy; and

an optical detection window in optical registration with said working electrode.

25. An electrochemiluminescence cell comprising:

a working electrode;

a counter electrode having a field extending element; and

a support, optionally attached to said counter electrode, having a transparent portion in optical registration with said working electrode; and wherein said field extending element is interposed between said transparent portion and said working electrode.

26. The cell of claim 25, wherein said field extending element traverses said transparent portion.

27. The cell of claim 25, wherein said field extending element comprises a ladder electrode.

28. The cell of claim 25, wherein said field extending element is a grid.

29. The cell of claim 28, wherein said field extending element reduces the electrochemiluminescence incident upon said transparent portion by less than 50%.

30. The cell of claim 29, wherein the current path aspect ratio is less than 2.5.

31. An electrochemiluminescence assay apparatus comprising:

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a working electrode;

a counter electrode;

a support, optionally attached to said counter electrode, having a transparent portion in optical registration with said working electrode;

a light detector in optical registration with said working electrode, said light detector being positioned closer to said counter electrode than said working electrode; and

a source of electrical energy, coupled to said electrodes, capable of maintaining said counter electrode at a constant potential or at a potential that does not vary relative to a potential of said light detector.

32. The apparatus of claim 31, wherein said source of electrical energy is a potentiostat.

33. The apparatus of claim 32, further comprising a magnet adjacent said working electrode to collect magnetizable particles thereon.

34. The apparatus of claim 33, wherein said apparatus comprises an electrochemiluminescence flow cell.

35. The apparatus of claim 34, further comprising a reference electrode.

36. The apparatus of claim 35, wherein said light detector is a photodiode.

37. A method of conducting an electrochemiluminescence assay comprising the step of inducing electrochemiluminescence at an electrode comprising a platinum alloy comprising:

a first predetermined weight percent of platinum; and

a second predetermined weight percent of an element other than platinum;

wherein said first predetermined weight percent and said second predetermined weight percent are greater than zero.

38. The method of claim 37, wherein said element is from the group comprising Ni, Pd, Co, Fe, Ru, Os, Cr, Mo, Zn, Nb, Ir, Rh and W.

39. The method of claim 37, wherein said element is a transition element.

40. The method of claim 38, wherein said second predetermined weight percent is in the range 1% to 80%.

41. The method of claim 40 wherein said electrode is a counter electrode.

42. The method of claim 40, wherein said electrode is a working electrode for generating electrochemiluminescence.

43. The method of claim 42, further comprising the steps of:

a. forming a composition comprising an electrochemiluminescence label and an electrochemiluminescence coreactant;

b. positioning said composition at said electrode;

c. applying electrical energy to said electrode to induce said electrochemiluminescence label to electrochemiluminesce; and

d. measuring an emitted electrochemiluminescence.

44. The method of claim 43, wherein said electrochemiluminescence label is an organometallic complex.

45. The method of claim 44, wherein said organometallic complex is a polypyridyl complex of Ru or Os.

46. The method of claim 44, wherein said organometallic complex comprises a ruthenium-*tris*-bipyridine moiety.

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47. The method of claim 46, wherein said electrochemiluminescence coreactant is a molecule capable of being oxidized to produce a strong reductant.

48. The method of claim 47, wherein said electrochemiluminescence coreactant is a tertiary amine.

49. The method of claim 48, wherein said tertiary amine is tripropylamine.

50. The method of claim 49, further comprising the step of collecting a magnetizable particle on said working electrode.

51. The method of claim 50, wherein said electrochemiluminescence label is present on said magnetizable particle.

52. The method of claim 51, further comprising the step of cleaning said working electrode by applying electrical energy to said working electrode.

53. The method of claim 52, wherein electrochemiluminescence is induced within an electrochemiluminescence flow cell.

54. A method of conducting an electrochemiluminescence assay comprising the step of inducing electrochemiluminescence at an electrode comprising rhodium or a rhodium alloy comprising:

a first predetermined weight percent of rhodium; and

optionally, a second predetermined weight percent of an element other than rhodium;

wherein said first predetermined weight percent and said second predetermined weight percent are greater than zero..

55. The method of claim 54, wherein said element is from the group comprising Pt, Ni, Pd, Co, Fe, Ru, Os, Cr, Mo, Zn, Nb, Ir, and W.

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56. A method of conducting an electrochemiluminescence assay comprising the step of inducing electrochemiluminescence at an electrode comprising an iridium alloy comprising:

a first predetermined weight percent of iridium; and

a second predetermined weight percent of an element other than iridium;

wherein said first predetermined weight percent and said second predetermined weight percent are greater than zero.

57. The method of claim 56, wherein said element is from the group comprising Pt, Ni, Pd, Co, Fe, Ru, Os, Cr, Mo, Zn, Nb, Rh, and W.

58. The method of claim 56, wherein said element is platinum.

59. A method of conducting an electrochemiluminescence assay comprising the steps of:

a. forming a composition comprising an electrochemiluminescence label and an electrochemiluminescence coreactant;

b. positioning said composition at a working electrode;

c. applying electrical energy to said working electrode and a counter electrode to induce said electrochemiluminescence label to electrochemiluminesce; and

d. measuring an emitted electrochemiluminescence;

wherein said counter electrode comprises rhodium, iridium, a rhodium alloy, an iridium alloy or a platinum alloy.

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60. A method of conducting an electrochemiluminescence assay comprising the steps of:

a. forming a composition comprising an electrochemiluminescence label and an electrochemiluminescence coreactant in an electrochemiluminescence assay apparatus comprising:

i. a working electrode;

ii. a counter electrode having a field extending; element;

iii. a support optionally adjacent to said counter electrode, having a transparent portion; and

iv. a light detector;

wherein said field extending element is interposed between said working electrode and said transparent portion; and

wherein each of said light detector and said transparent portion are in optical registration with said working electrode;

b. applying electrical energy to said working electrode and said counter electrode to induce said electrochemiluminescence label to electrochemiluminesce; and

c. measuring an emitted electrochemiluminescence.

61. A method of conducting an electrochemiluminescence assay comprising the steps of:

a. forming a composition comprising an electrochemiluminescence label and an electrochemiluminescence coreactant in an electrochemiluminescence assay apparatus comprising:

i. a working electrode;

ii. a counter electrode; and

iii. a light detector;

wherein said counter electrode is positioned closer to said light detector than said working electrode is;

b. applying electrical energy to said working electrode and said counter electrode to induce said electrochemiluminescence label to electrochemiluminesce while said counter electrode is at a constant potential or at a potential that does not vary relative to a potential of said light detector; and

c. measuring an emitted electrochemiluminescence.